



FM Diversion Plan B Additional In-Town Measures



Overview

- *Plan B – New Diversion Alignment*
- *Completed In-Town Projects Since 2009*
- *In Progress In-Town Projects*
- *Previous Identified In-Town Projects (Revised Comp Plan)*
- *37-foot Impacts*
 - *Identifying Locations*
 - *Conceptual Projects*
- *Path Forward*

An aerial photograph of a city street in winter, covered in snow. A large blue rectangular overlay is centered over the image, containing the text "Plan B" in a black, italicized serif font. The background shows various city buildings, a parking lot with cars, and a river or canal on the right side. The text "Plan B" is the central focus of the image.

Plan B

Evolution of Plan B



September 2017

- Gov. Burgum and Gov. Dayton meet in Moorhead to discuss the flood protection



Governor's Task force assembled

- Five meetings between Oct. and Dec. 2017
- Wide geographic representation



Technical Advisory Group

- Diversion Authority, MDNR, USACE, and R/W JPA engineer
- Further analysis and iteration of unresolved issues from the Task Force



Policy Group

- Leadership from the USACE, MDNR, Diversion Authority, and R/W JPA
- Held four meetings

Task Force Consensus

- Utilize full Period of Record hydrology
 - 100-yr flood = 33,000 CFS
- Allow control of flood water flows through town to 37-feet during a 100-yr flood event
- New Western Tie-back Levee alignment in North Dakota
- Add an Eastern Tie-back Levee alignment in Minnesota
- Distributed storage is valuable for long-term risk management; however, it is not a component of the near-term Project that needs to provide 100-year flood protection for the F-M Metro

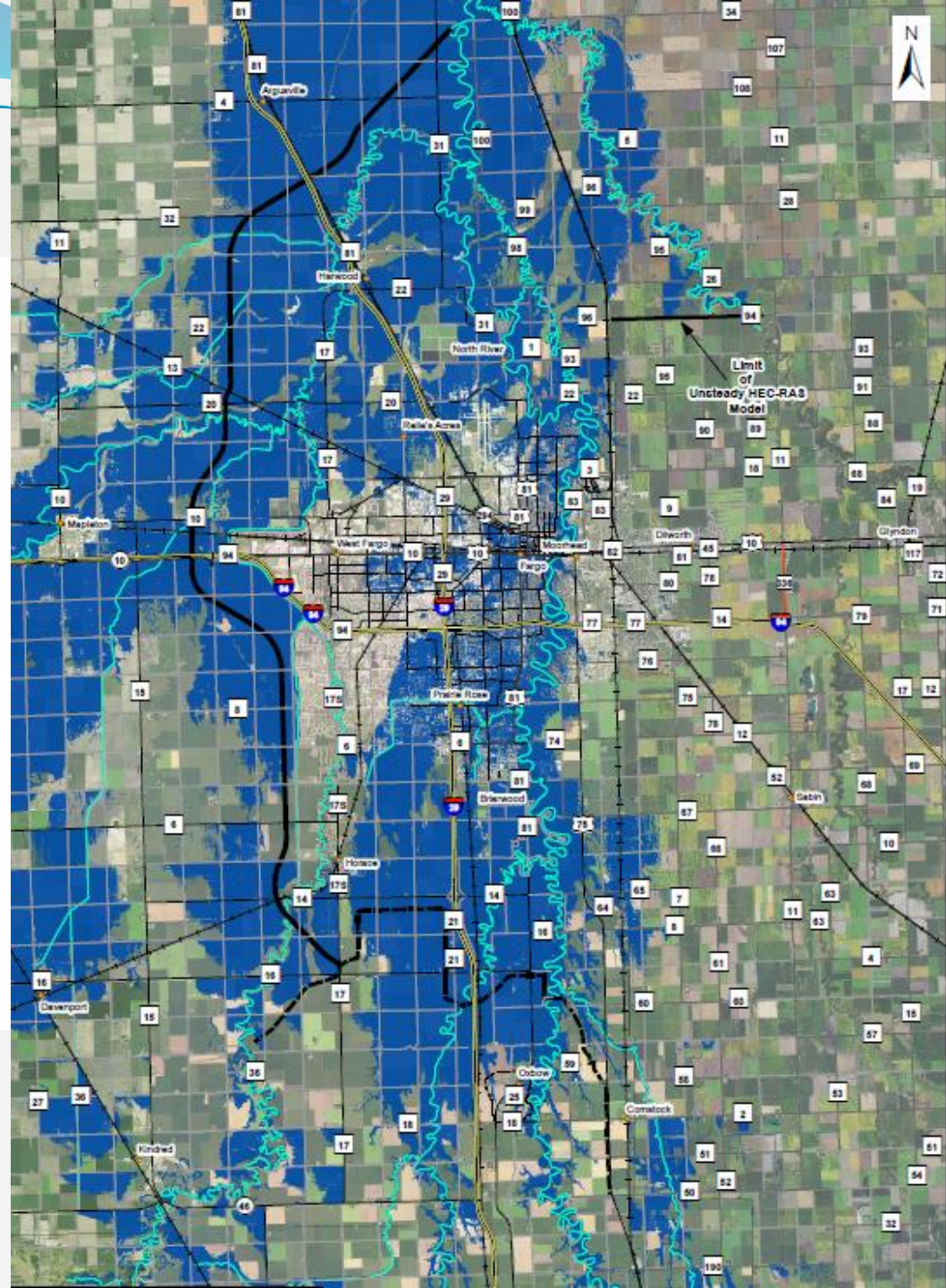
What is Plan B?

- 100-year Flood Protection Minimum
 - Some features designed to PMF (Probable Maximum Flood) as required by State and Federal Dam Safety Requirements
- Diversion Channel
- Southern Embankment and Control structures
- Temporary Staging of Flood Waters Upstream
- In-town Levees through Fargo-Moorhead



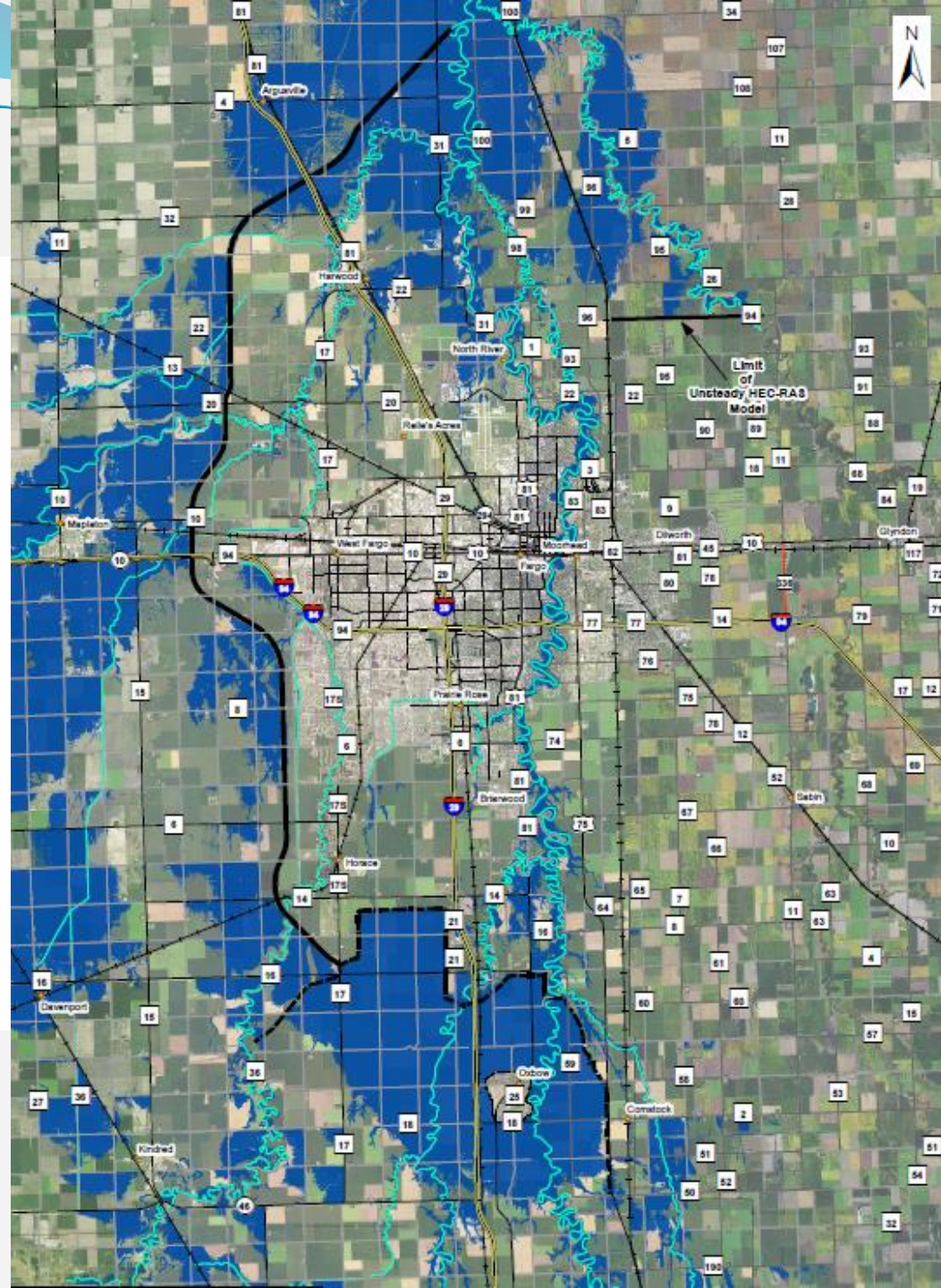
Existing Conditions

- 100-year floodplain shown in Blue



With Project

- 100-year floodplain with project shown in Blue



Recent Efforts

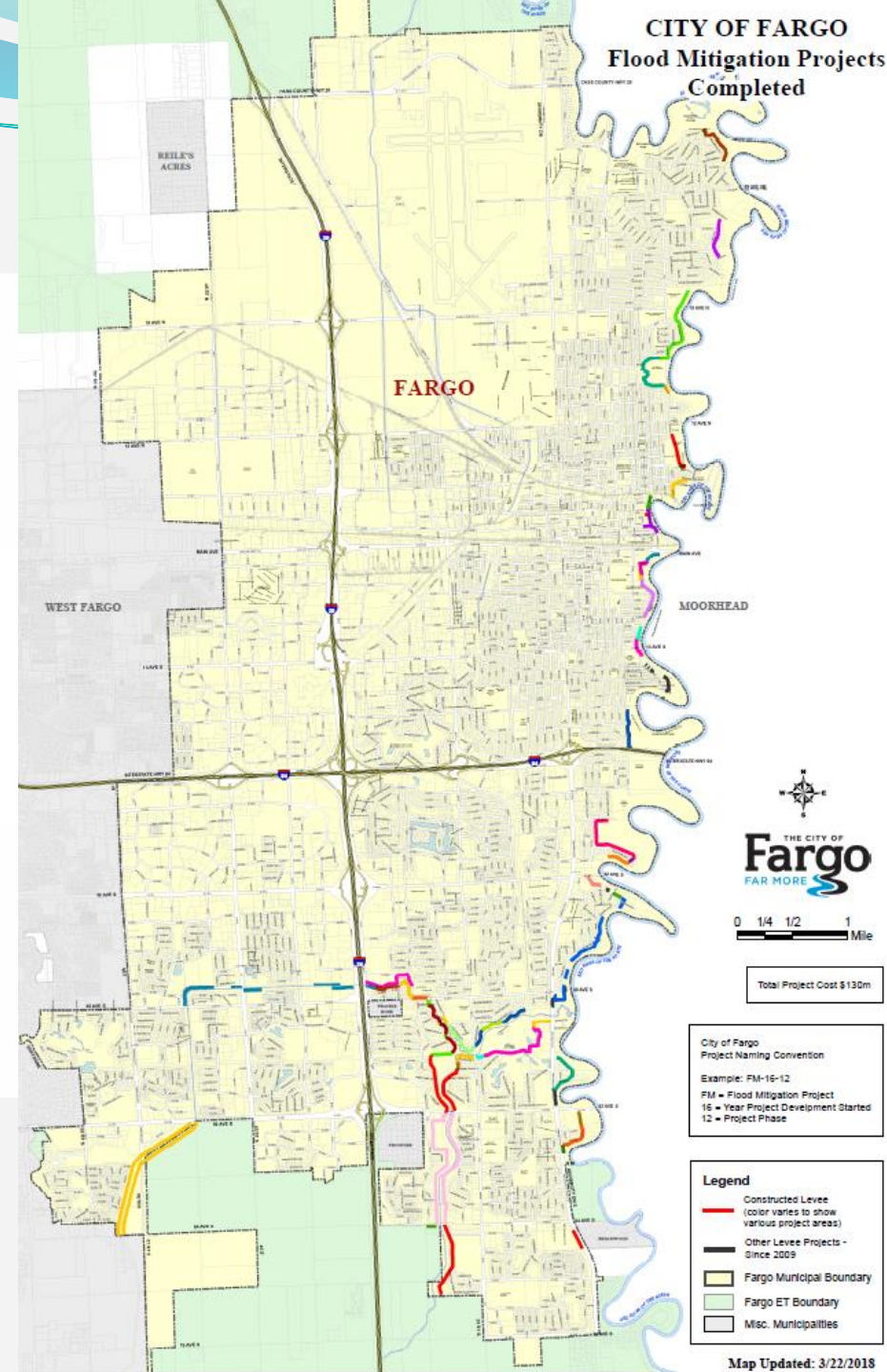
- DNR Permit submitted on March 16, 2018
- Micro-siting of alignment
- Provide Support for DNR during preparation of their Supplemental EIS.
- Provide Support to USACE during preparation of their Supplemental EA.
- Additional H&H Development and Dam Breach Analysis.

An aerial photograph of a city street in winter. The ground is covered in snow, and the rooftops of buildings are also white. A river flows along the right side of the street. In the center, a large blue banner with the text "Completed Projects" is overlaid. The banner has a white border and a slight shadow. The text is in a black, serif font.

Completed Projects

PROJECTS SINCE 2009

- Constructed over 20 miles
 - *47 miles of emergency levees constructed by the City in 2009
- Project Cost ≈ \$270 million
- Reduces required sandbags by approximately 5 million
 - Needed over 6 million in 2009
- All completed projects are built to proper elevations to accommodate Plan B's proposed 37' flow thru town



PROJECT ACQUISITIONS SINCE 2009

- 232 Properties Purchased
 - Over 370 since 1990
- At cost of over \$95 million
- 9 Acquisitions Remaining from Revised Comprehensive Plan



COMPLETED PROJECTS



ROSE CREEK AREA

- North Side

- Combination of levee & floodwall
- 1200-feet of earthen levee & floodwall under construction
- Will eliminate need for 700k sandbags once completed

- South Side

- Earthen levee thru golf course completed



ROSE CREEK AREA

Floodwall

25th Street

Levee

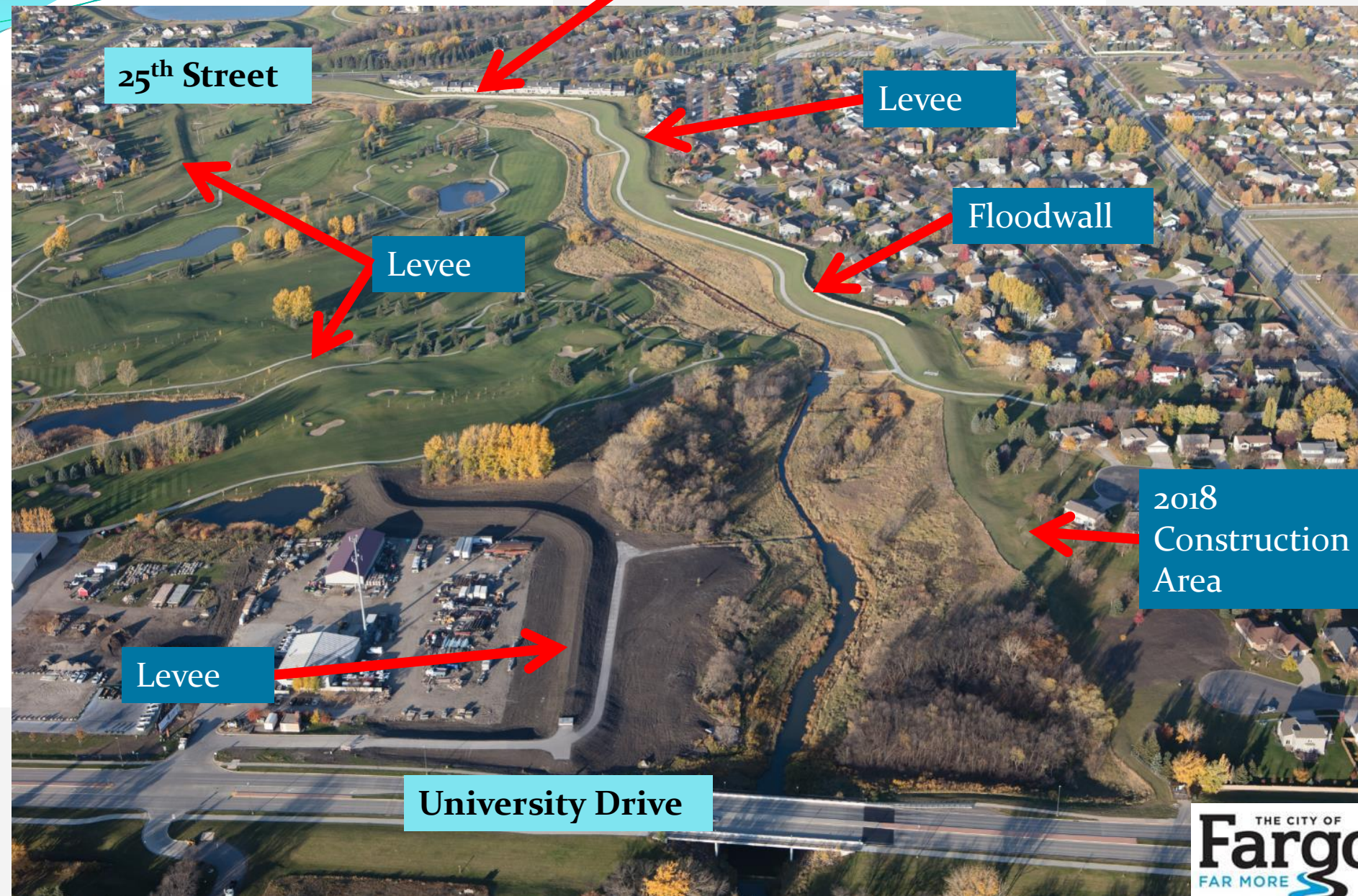
Floodwall

Levee

2018
Construction
Area

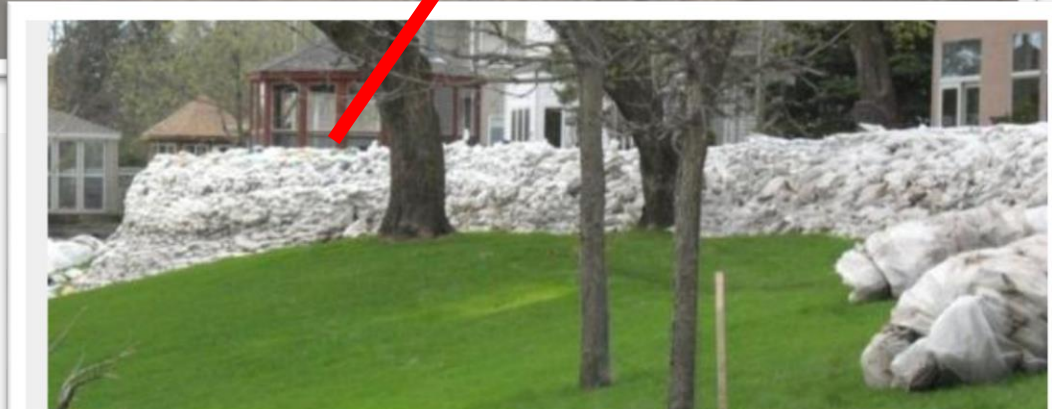
Levee

University Drive



HARWOOD, HACKBERRY & RIVER DRIVE AREA

- Project Features – Earth Levee & Storm Sewer Lift Station
 - 59 Property Acquisitions (3 remaining)
 - Will eliminate need of 1.3 million sandbags once completed



HARWOOD, HACKBERRY & RIVER DRIVE AREA



2ND STREET N AREA

- Protection height of 44' required approx. 25,000 CY of clay



2011/4/9 11:19

2ND STREET N AREA

- Project Features – Floodwall, Storm Sewer Lift Station & 2nd Street Relocation (moves west approx. 100-feet)
- 7 Property Acquisitions and Permanent Easements



2ND STREET N AREA



2ND STREET N AREA



2017



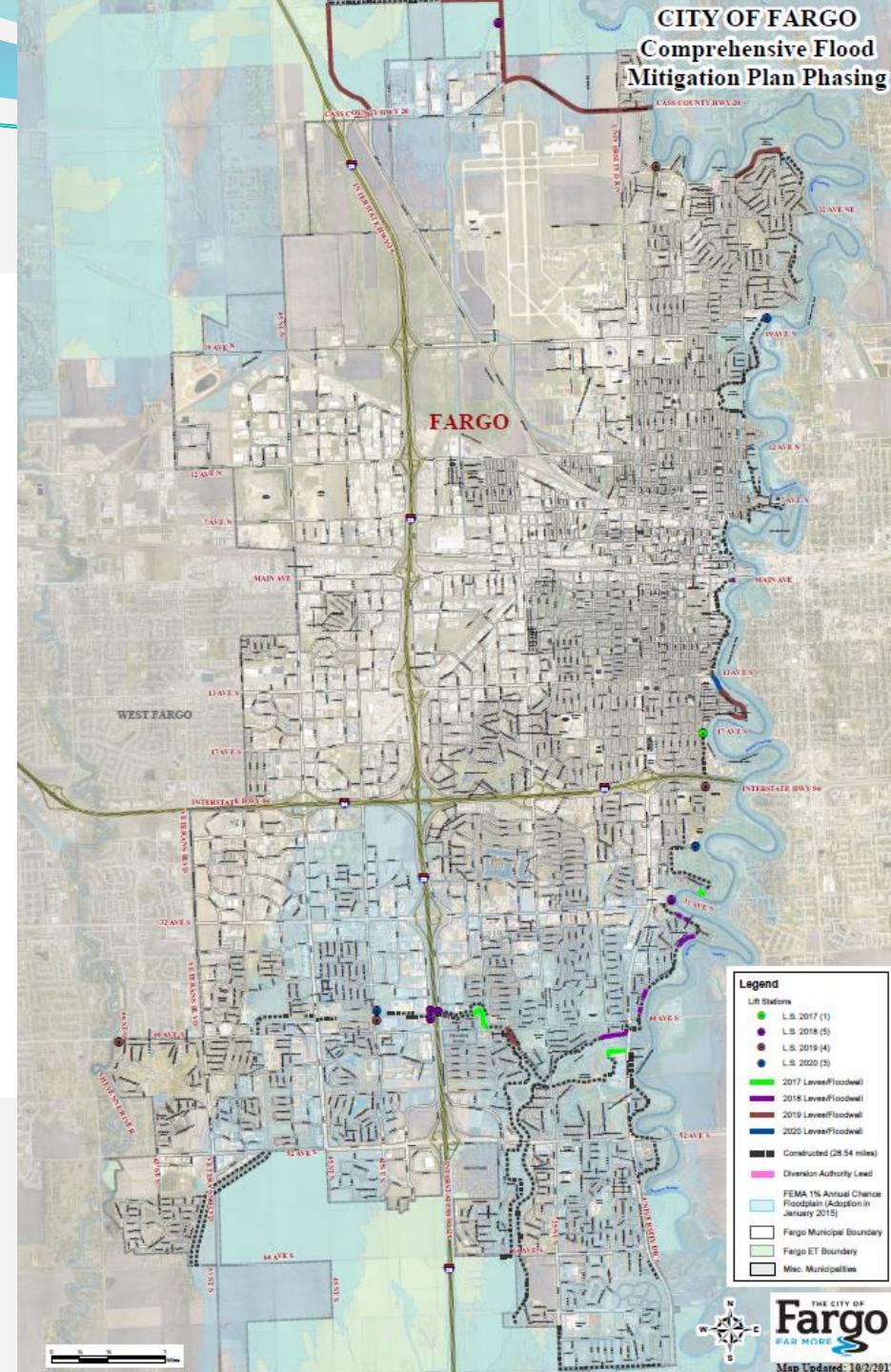
2009 Flood

An aerial photograph of a city street in winter. The ground is covered in snow, and the roofs of buildings are also white. A river flows along the right side of the street. In the center, a large blue banner with white text reads "Under Construction Projects".

Under Construction Projects

2018 PROJECTS

- 4 Projects
 - Rosewood
 - Hackberry, Harwood & River Drives
 - Bison Meadows
 - Drain 40 (19th Ave N & 45th St)
- Total Length ≈ 1.75 miles
- Total Construction Cost ≈ \$5.5M



ROSEWOOD ADDITION

- Project Features – Earth Levee, Floodwall & Storm Sewer Lift Station
 - 7 Property Acquisitions
 - Last Segment on Rose Coulee from 25th Street to University Drive



HARWOOD, HACKBERRY & RIVER DRIVE AREA

- Project Features – Earth Levee
- 3 Acquisitions Remain to Complete Entire Neighborhood

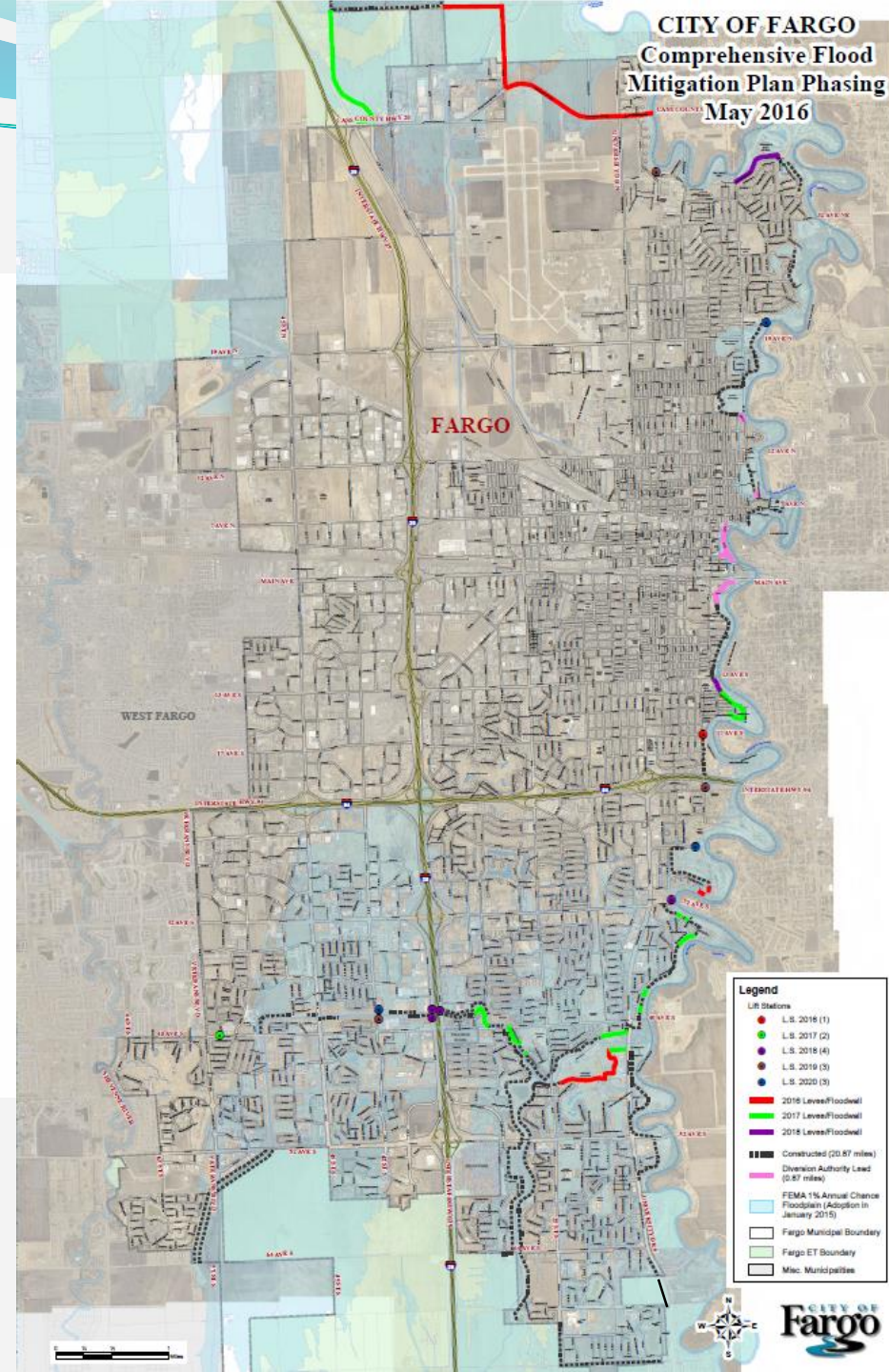


An aerial photograph of a city street in winter. The ground is covered in snow, and the roofs of buildings are also white. A river flows along the right side of the street. In the center, a large blue banner with the text "Revised Comp Plan" is overlaid. The banner has a wavy, water-like texture. The text is in a black, serif font.

Revised Comp Plan

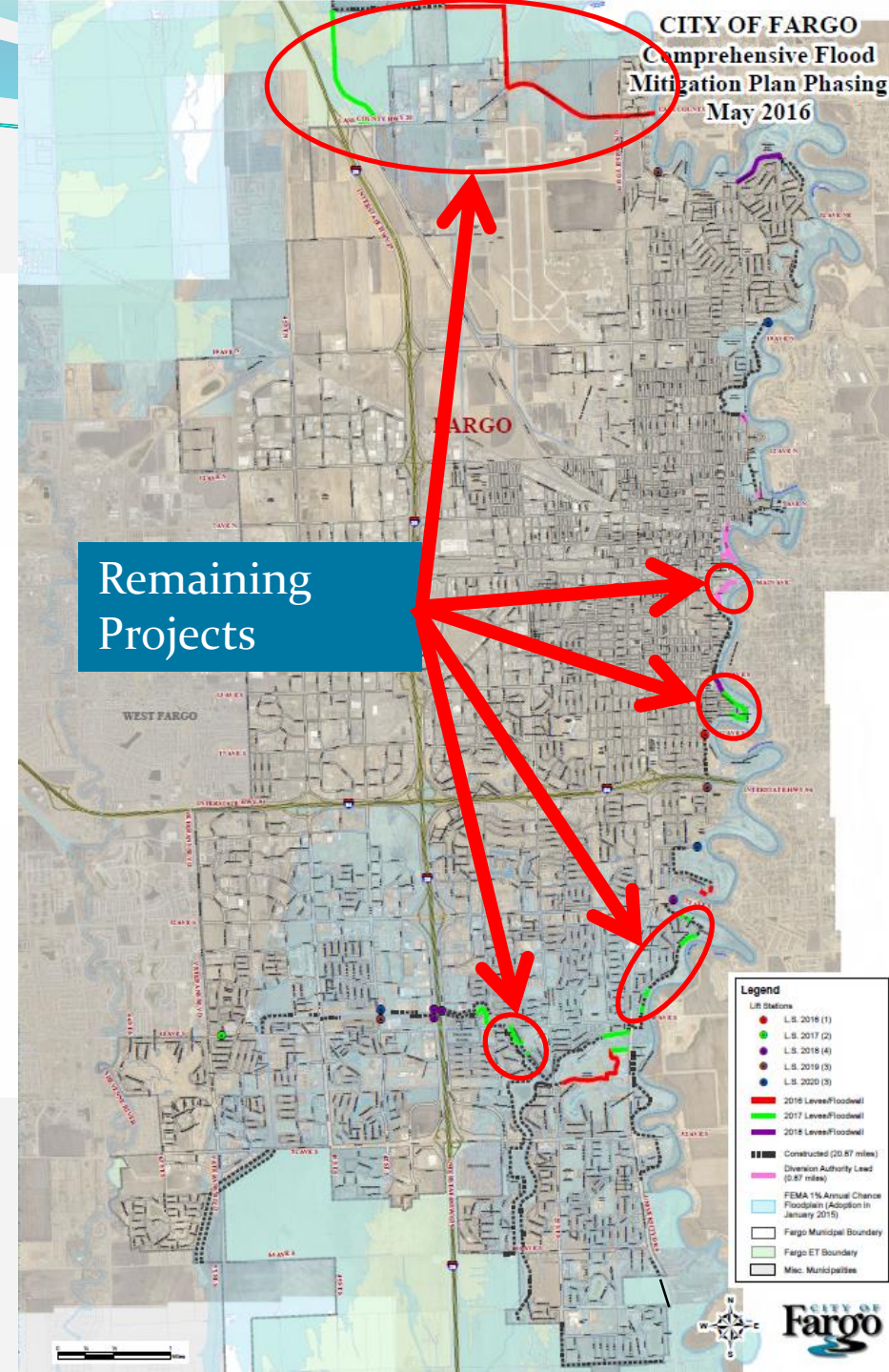
REVISED COMPREHENSIVE PLAN

- Approved by City Commission in May of 2016
- Prioritized projects in areas that were hardest to provide emergency protection for.
- Projects consisted of:
 - Home Acquisitions
 - Levee & Floodwall Construction
 - Storm Sewer Lift Station Replacements
- Identified Approximately \$104M (2016) in Project Costs



REVISED COMPREHENSIVE PLAN

- 5 Projects Remain To Be Constructed
 - Oakcreek & Copperfield Court
 - Harwood, Hackberry & River Drives
 - Belmont Addition
 - Main Avenue/2nd Street S
 - Drain 10/Airport Area
- Lift Station Replacement – 9 Remaining

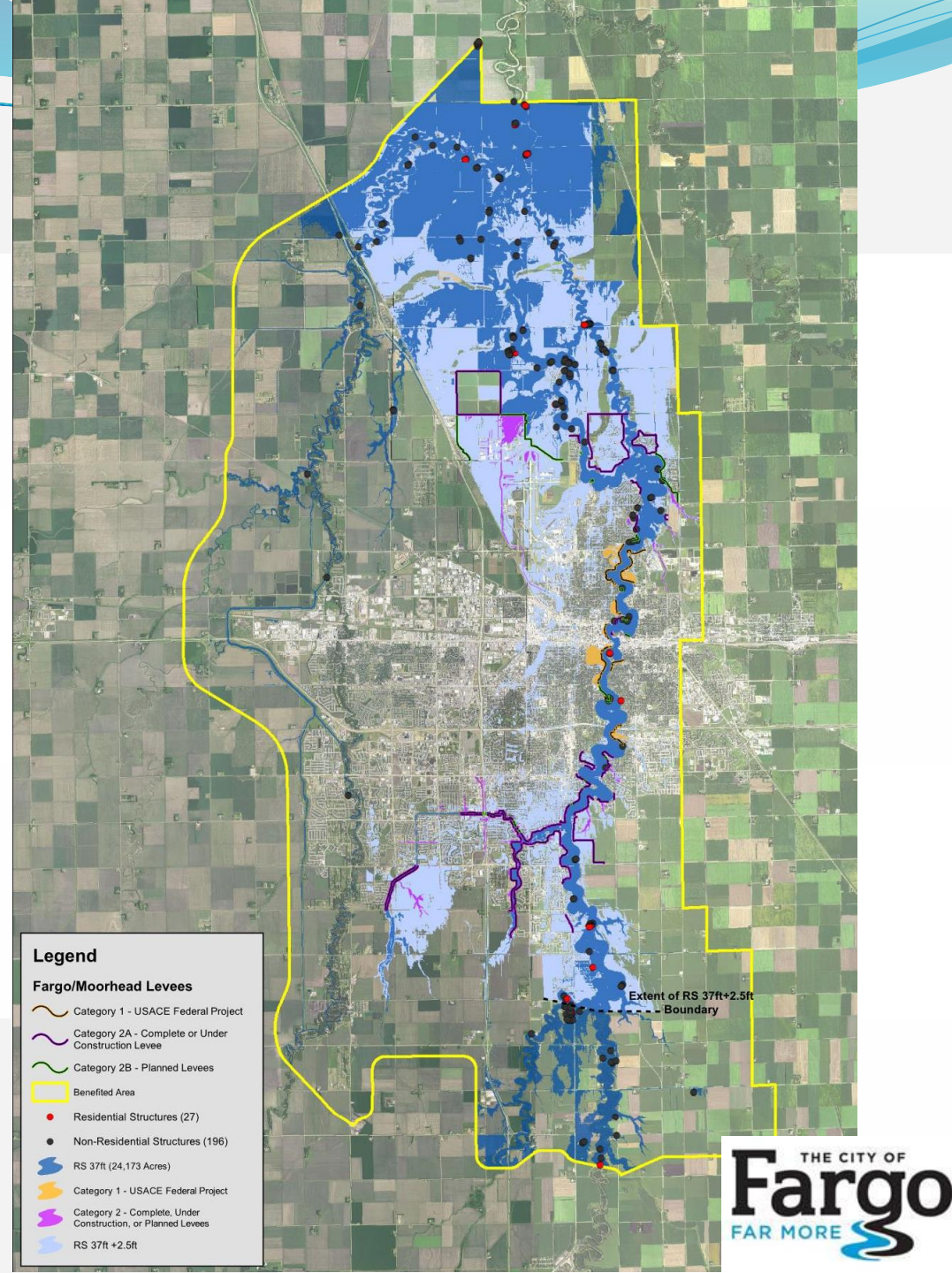


An aerial photograph of a city street in winter. The ground is covered in snow, and the roofs of buildings are also white. A river flows along the right side of the street. A large blue banner with the text "37' Impacts" is overlaid on the image.

37' Impacts

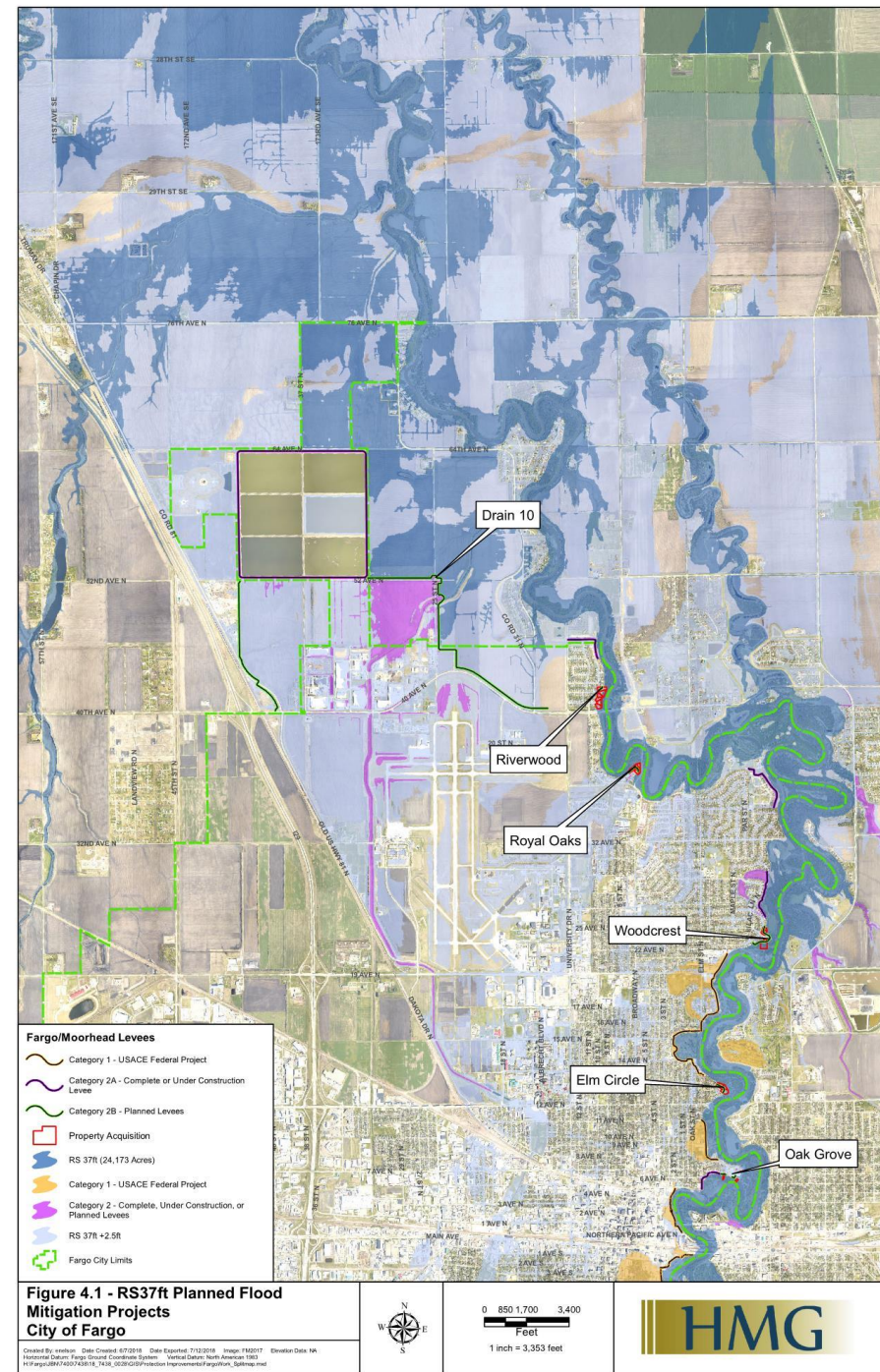
RS37' Impacts

- 27 Impacted Residential Structures (within Diversion project boundary)
- 196 Impacted Non-Residential Structures (within Diversion project boundary)

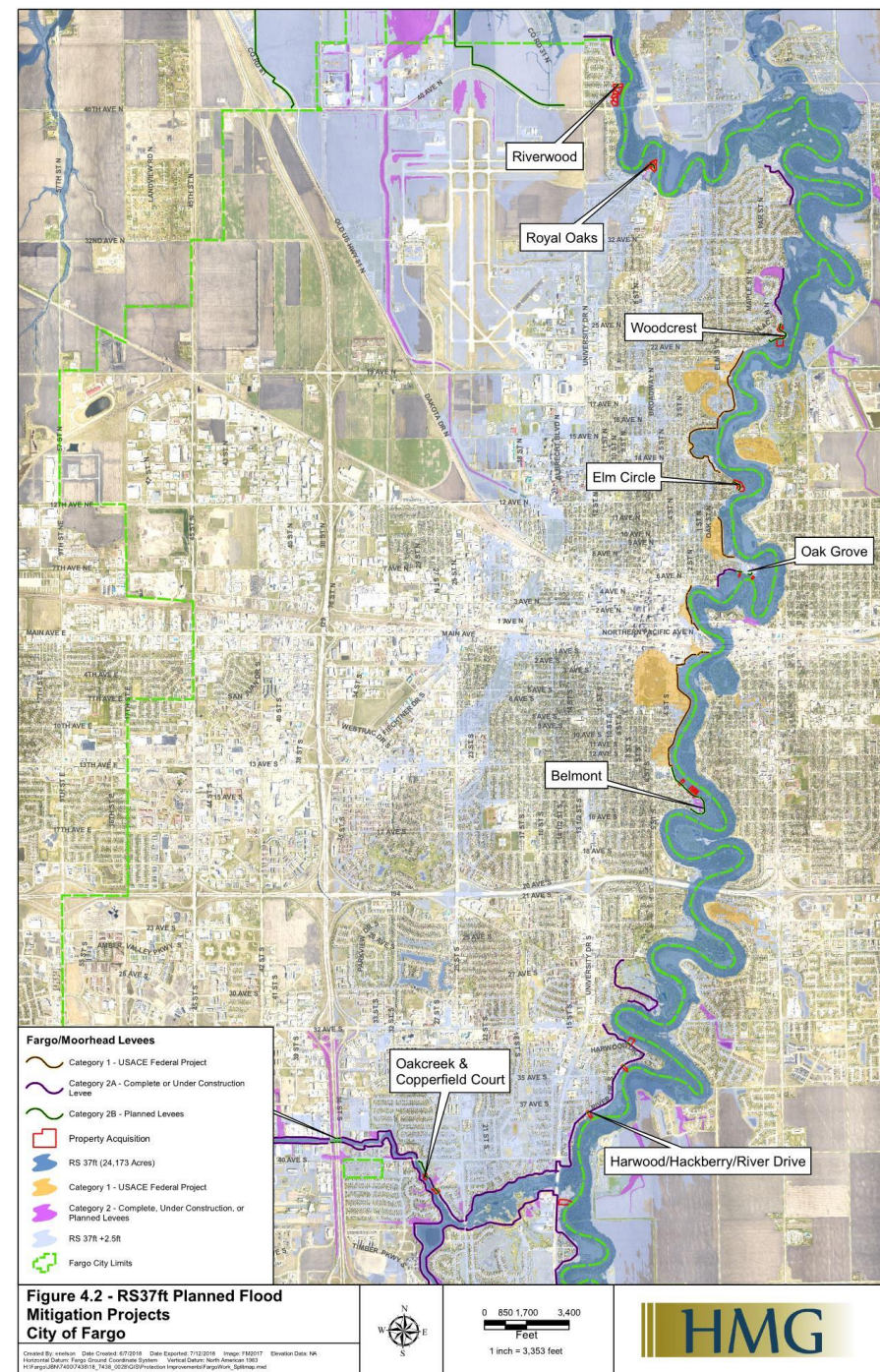


RS37' Impacts

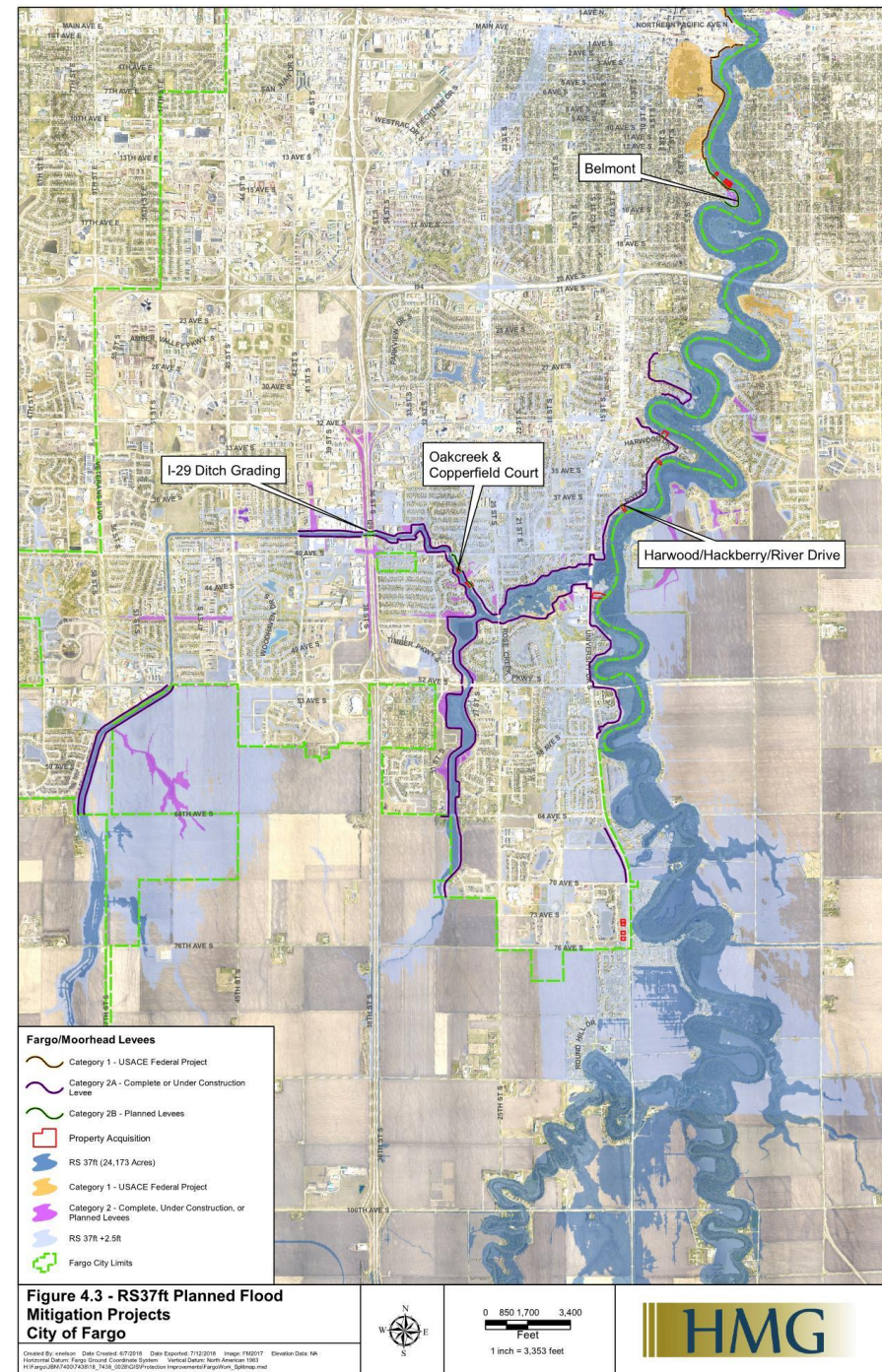
- River Stage 37'
- River Stage 37' plus 2.5-feet



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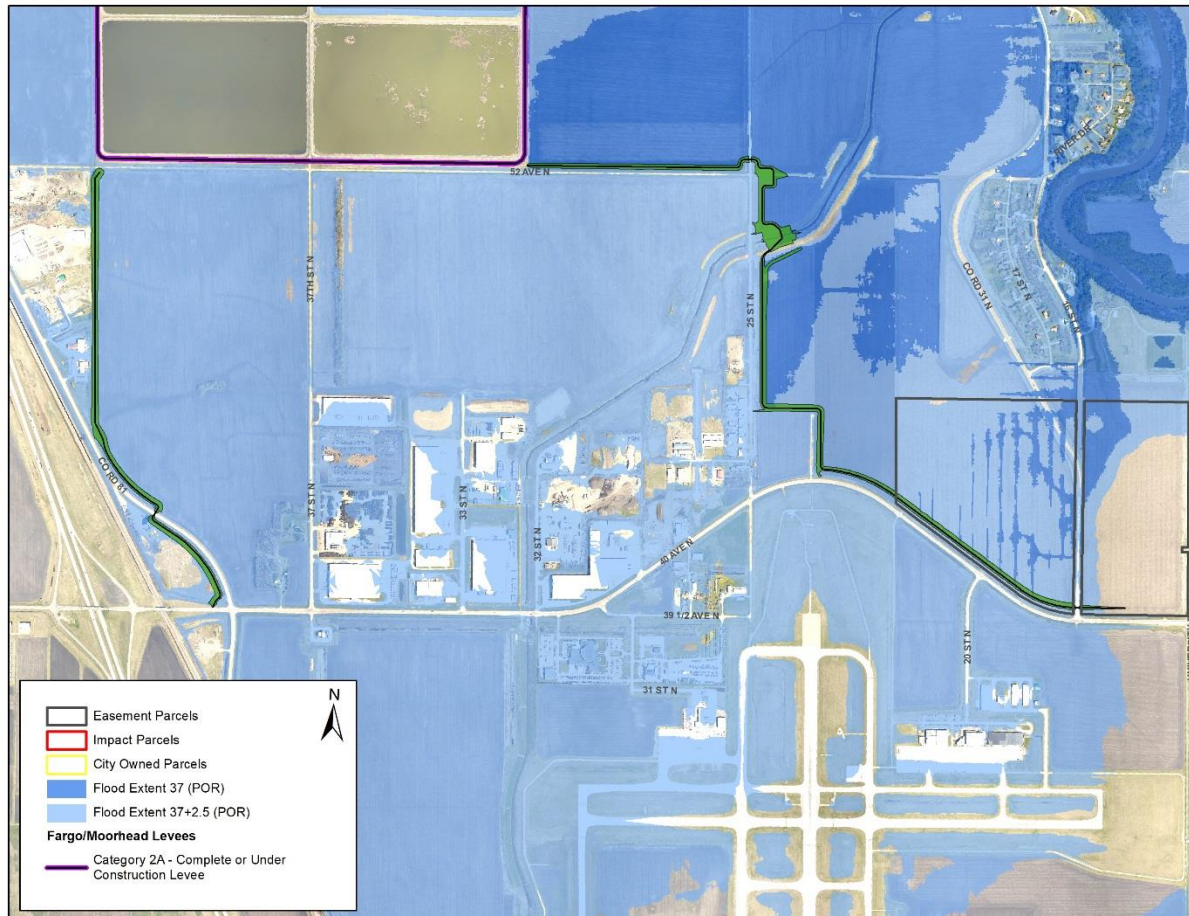


- River Stage 37'
- River Stage 37' plus 2.5-feet



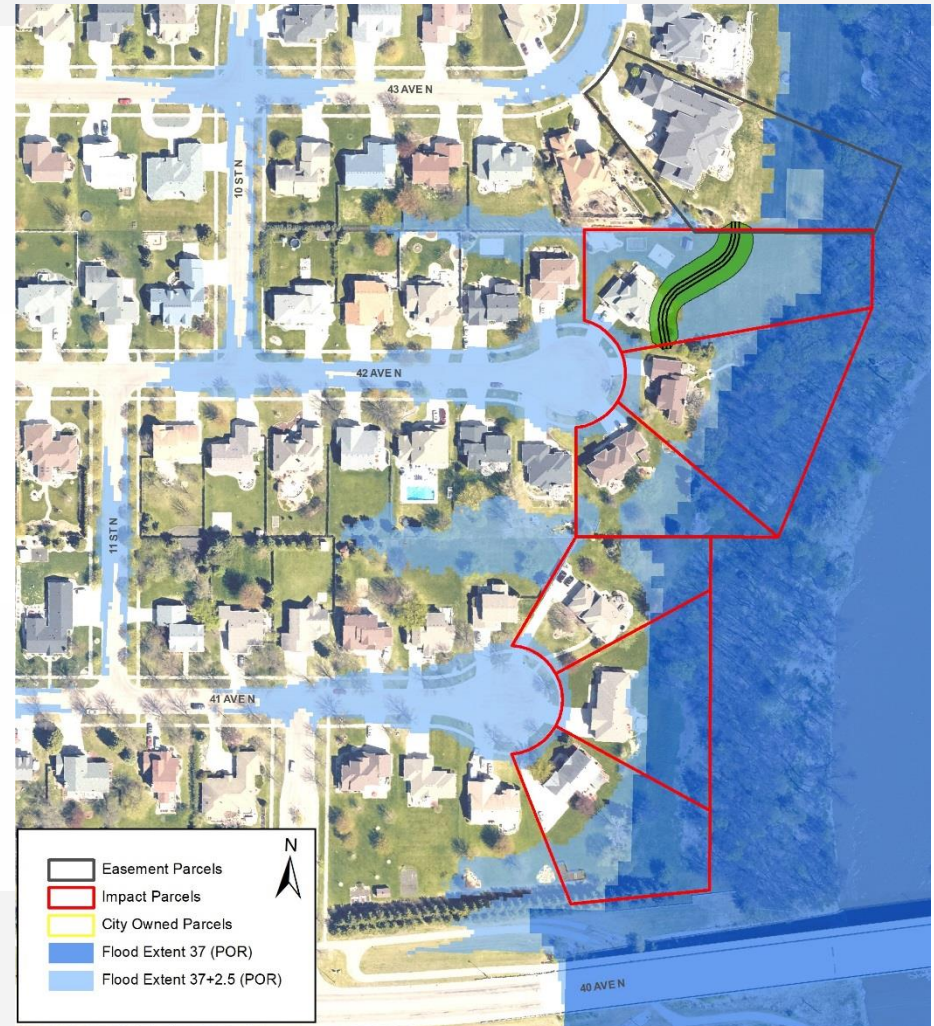
Plan B (37-feet) – North Side/Drain 10 Protection

- Earth Levee & Storm Sewer Lift Station Relocation
- Permanent easements will need to be acquired for footprint of levee
- Levee will tie into existing levee around the wastewater lagoons



Plan B (37-feet) – Riverwood Addition

- Complete Property Acquisitions – 6
- Land Easement Acquisition – 1
- Levee Construction on Property Acquisitions



Plan B (37-feet) – Royal Oaks Area

- Complete Property Acquisitions - 12
 - 2 existing vacant lots
- Levee Construction on Property Acquisitions
- Cul-de-sac relocated to allow levee construction



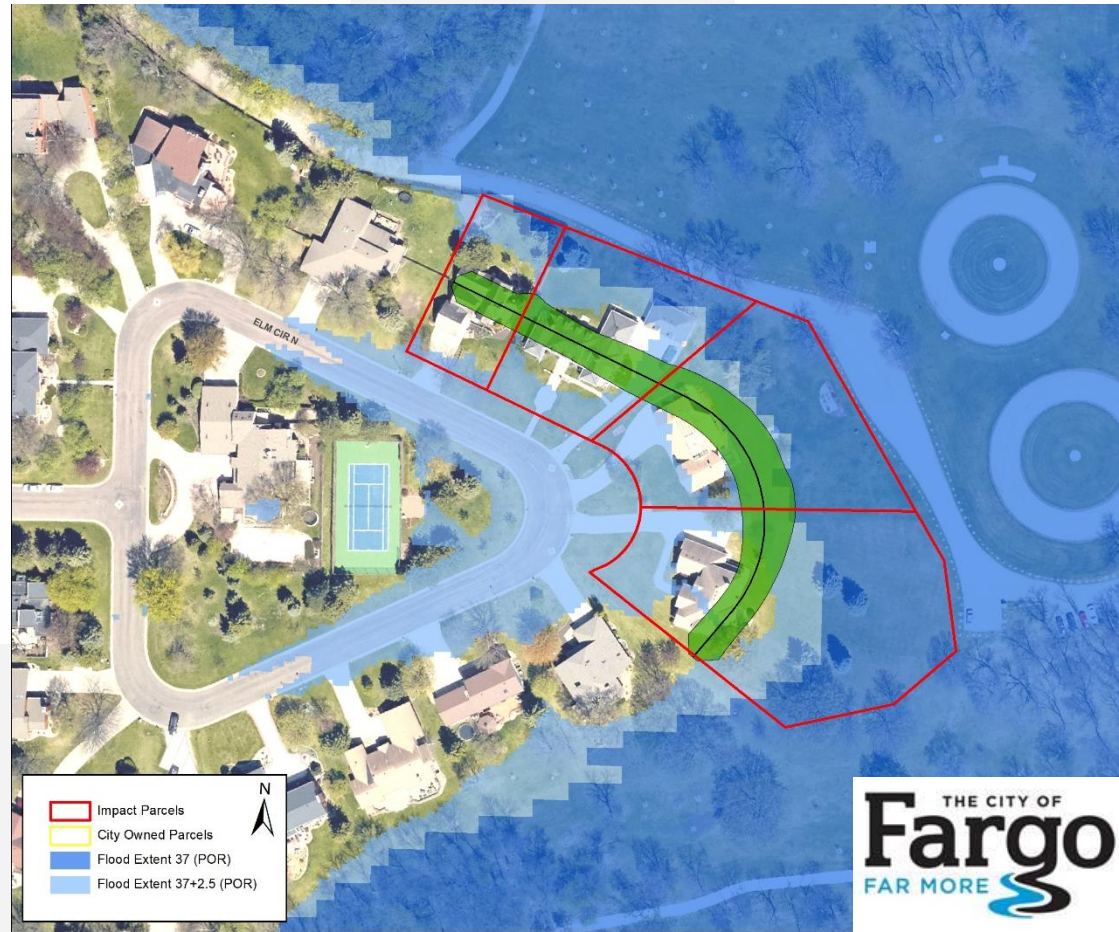
Plan B (37-feet) – Woodcrest Addition

- Complete Property Acquisitions – 4
 - Previous Acquisitions – 6
- Land Easement Acquisitions – 5
- Levee Construction on Property Acquisitions
- Relocation of Storm Sewer Lift Station



Plan B (37-feet) – Elm Circle Area

- Complete Property Acquisitions – 4
- Levee Construction on Property Acquisitions



Plan B (37-feet) Oak Grove

- Complete Property Acquisitions – 2
- Levee Construction on Property Acquisitions
- Road Raise on South Terrace
- Oak Grove School will remain and will continue to be within 100yr floodplain.
 - Existing protection around school will protect against 37-foot floods but is not able to be accredited by FEMA.



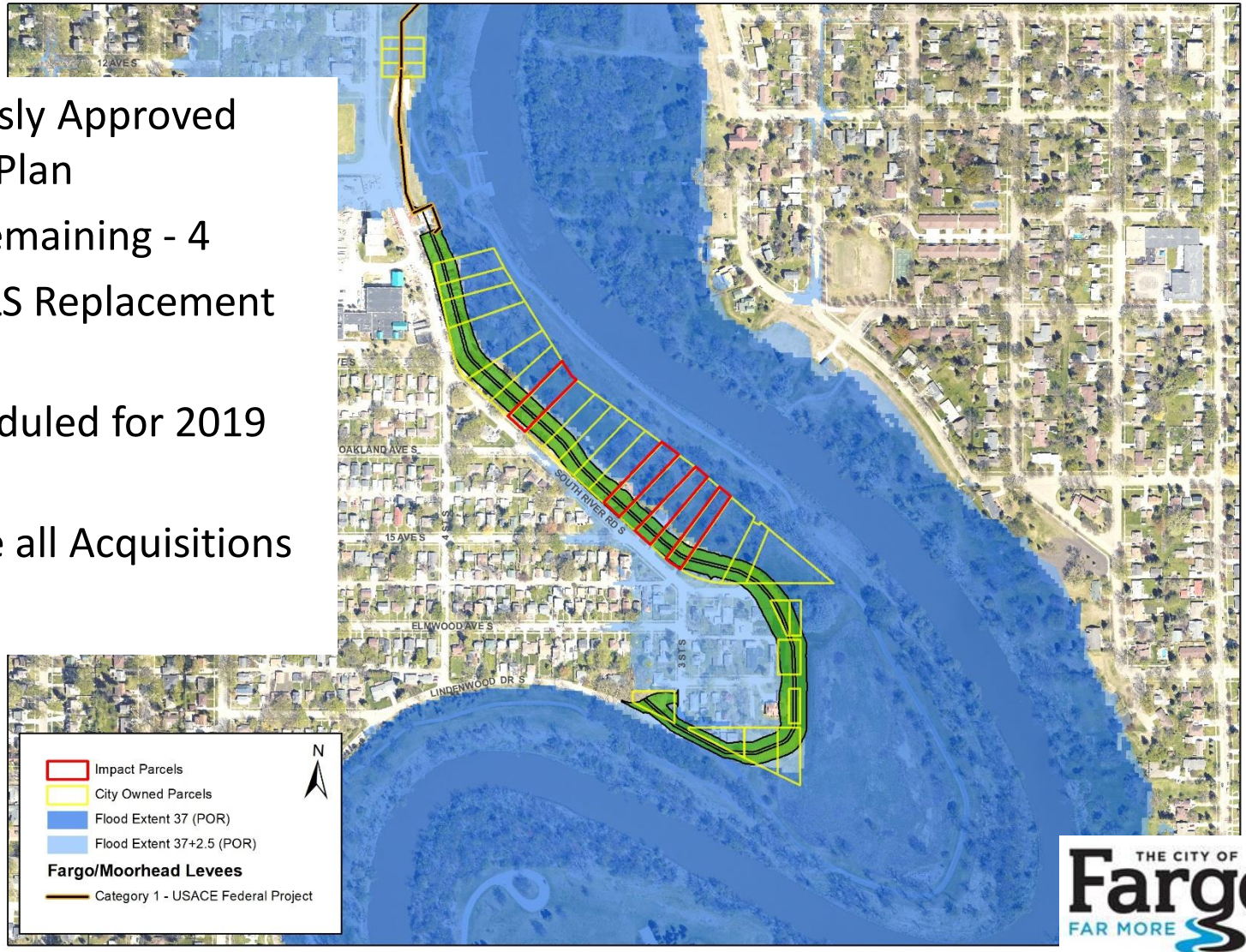
Plan B (37-feet) Main Ave and 2nd St. S.

- Part of Previously Approved Revised Comp Plan
- Acquisitions Complete
- Phase 1 – Levee Construction Complete
- Phase 2 – Lift Station and Floodwall design complete.
 - Construction 2019 & 2020



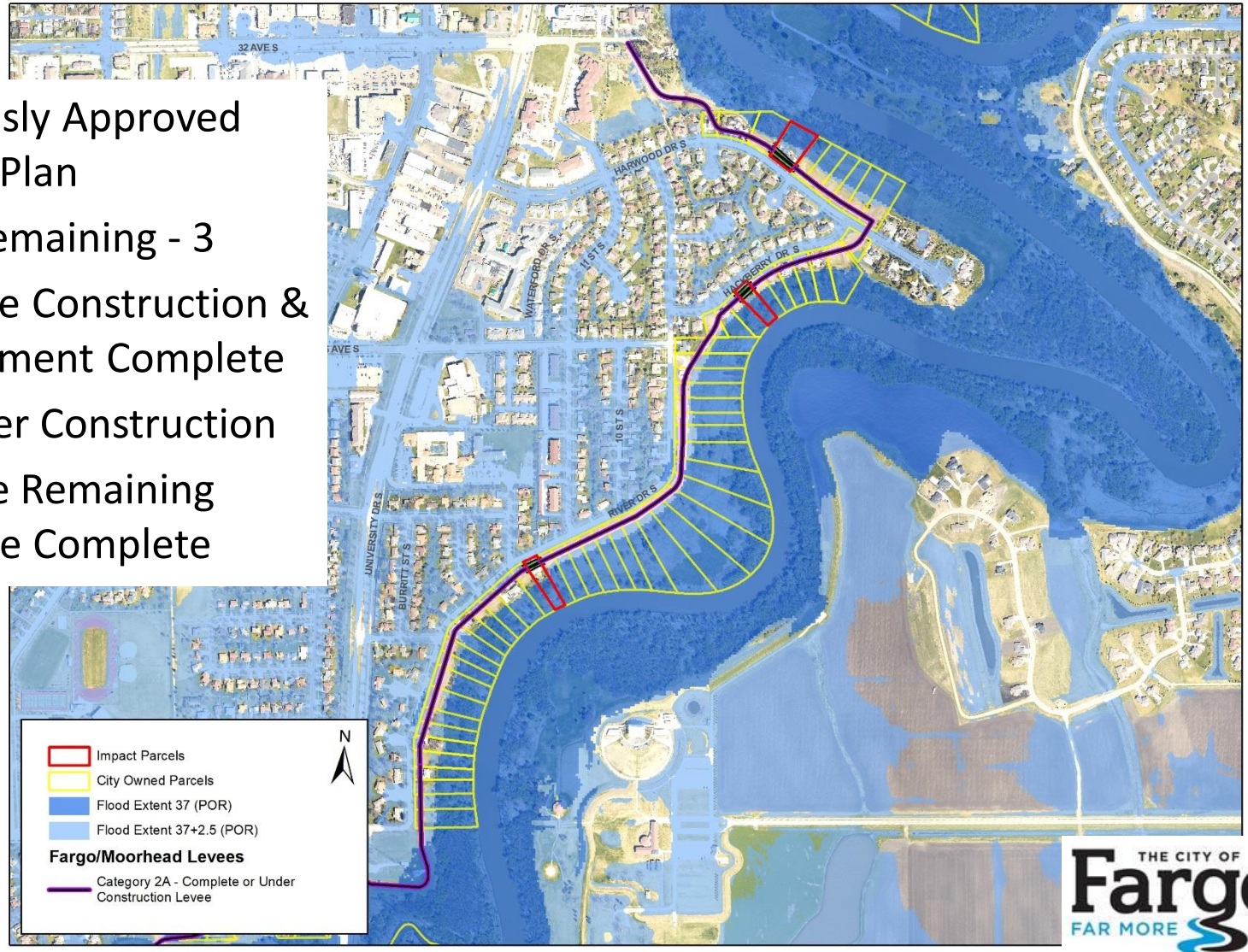
Plan B (37-foot) Belmont

- Part of Previously Approved Revised Comp Plan
- Acquisitions Remaining - 4
- Phase 1 – STS LS Replacement Complete
- Phase 2 – Scheduled for 2019 Construction
- Phase 3 – Once all Acquisitions are Complete



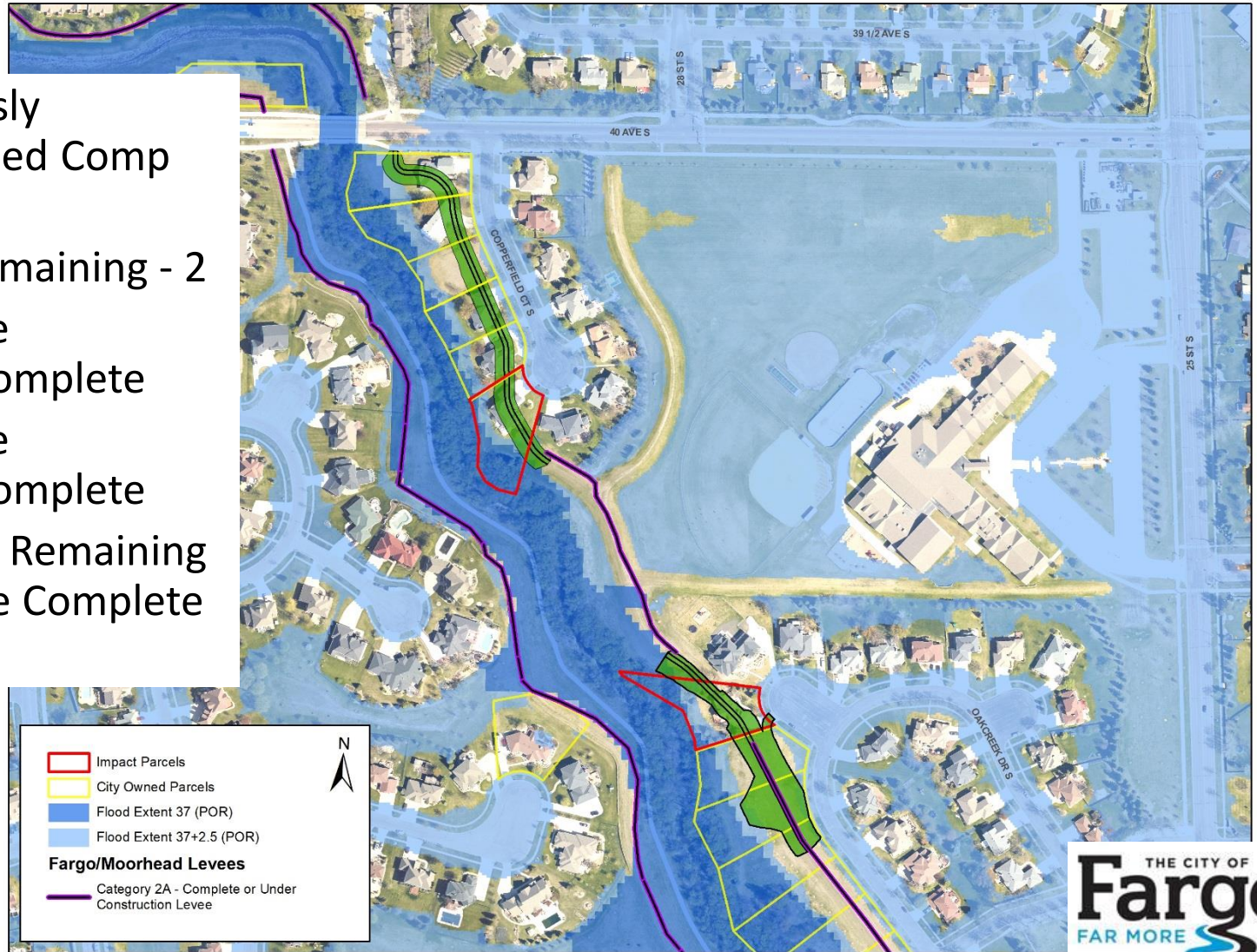
Plan B (37-feet) Harwood, Hackberry, River Dr.

- Part of Previously Approved Revised Comp Plan
- Acquisitions Remaining - 3
- Phase 1 – Levee Construction & STS LS Replacement Complete
- Phase 2 – Under Construction
- Phase 3 – Once Remaining Acquisitions are Complete



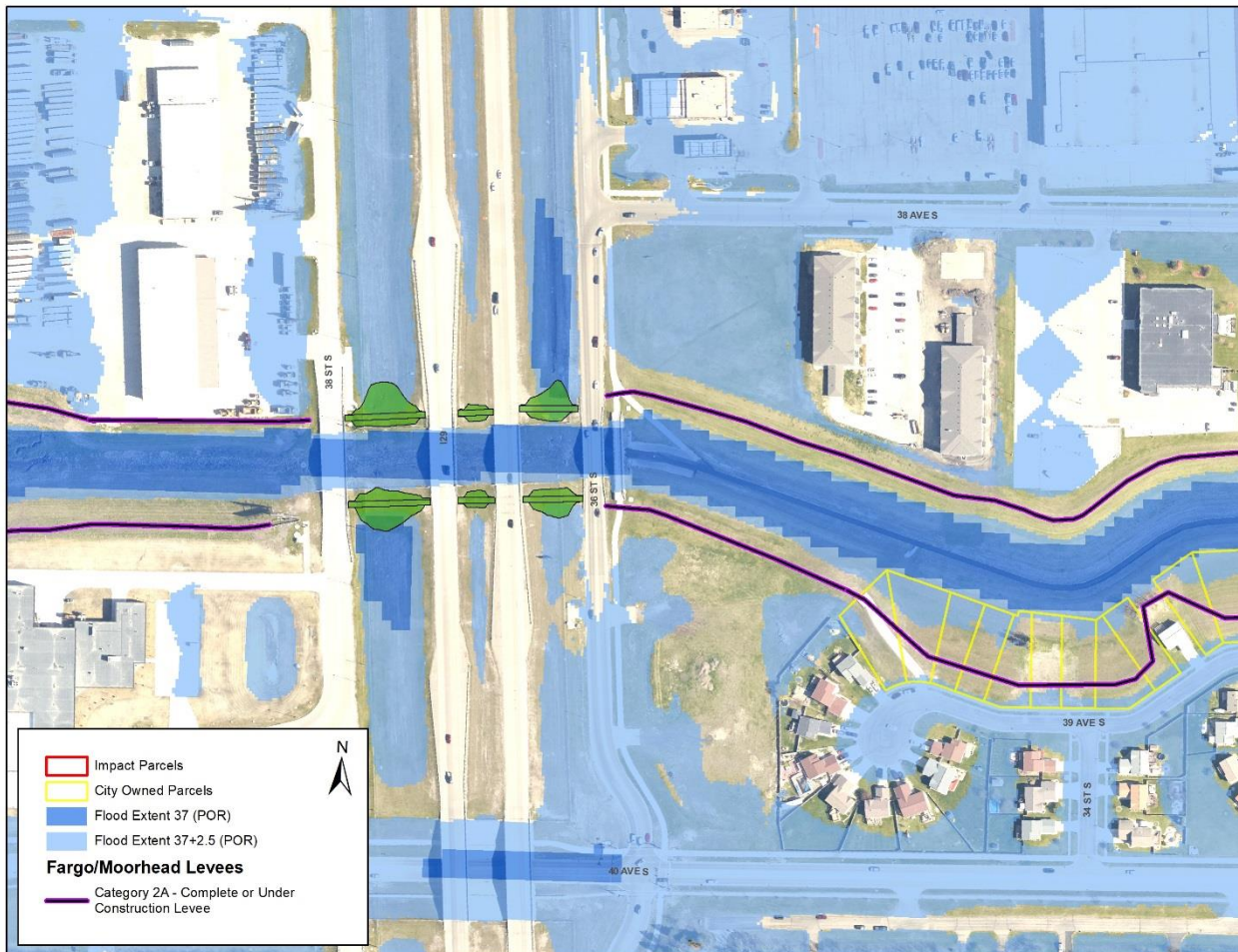
Plan B (37-feet) Copperfield Ct, Oakcreek

- Part of Previously Approved Revised Comp Plan
- Acquisitions Remaining - 2
- Phase 1 – Levee Construction Complete
- Phase 2 – Levee Construction Complete
- Phase 3 – Once Remaining Acquisitions are Complete



Plan B (37-feet) I-29 Ditch Grading

- Construct Levees in I29 ditches
- Improve Closures on Culverts within I29 Ditches



RS37' Impacts

- Reconstruct 18 Stormwater Lift Stations
 - 9 Previously Approved under Revised Comp Plan
- Recommended for Reconstruction due to lack of Pump Redundancy
 - Existing Lift Stations only have 1 Pump.
 - Current City Standards is to have 2 pumps, at minimum.



An aerial photograph of a city street in winter. The ground is covered in snow, and the rooftops of buildings are also white. A river flows along the right side of the street. The title "Path Forward" is overlaid on a blue rectangular background in the center of the image.

Path Forward

No action will be sought from City Commission on any of the potential projects identified as being necessary to pass 37-foot flows thru town until MnDNR has made a permit decision on the Diversion Authority's Plan B permit application.

Staff will continue to implement the projects remaining within the Revised Comp Plan (as approved by City Commission in May of 2016) until this permit decision has been made.

Questions & Comments

